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EXAMINER	
KNOLL, CLIFFORD H	

ART UNIT	PAPER NUMBER
2112	6

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/022,330	MCCONNELL ET AL.	
	Examiner	Art Unit	
	Clifford H Knoll	2112	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim1 is objected to because of the following informalities: Recitation "and multiple of" should apparently be "and a multiple of". Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 8, and 14-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Chatter (US 6108725).

Regarding claim 1, Chatter discloses determining if a designated port supports a multi-link mode operation for data transfers, via one or more links (e.g., col. 9, lines 50-52); and if the designated port supports the multi-link mode operation, configuring and training the designated port to serve as one of a single link capable port which transfer data via a single link, a multiple link capable port which transfers data via respective

multiple links, and multiple of single link ports which transfer data via a respective single link (e.g., col. 9, lines 35-38).

Regarding claim 2, Chatter also discloses the multi-link mode operation corresponds to a 4x mode operation where 4x indicates four (4) physical links between respective ports (e.g., col. 9, lines 35-38).

Regarding claim 3, Chatter also discloses the single link capable port corresponds to a 1x capable port which transfer data via a single 1x link, the multiple link capable port corresponds to a 4x capable port which transfers data via respective 4x links, and the multiple of single link ports correspond to four (4) independent 1x ports which transfer data via a respective single 1x link (e.g., col. 9, lines 35-38; Fig. 10).

Regarding claim 4, Chatter also discloses each link is trained independently to enable the designated port to serve as the 1x capable port, the 4x capable port, or the four (4) independent 1x ports (e.g., col. 9, lines 35-38).

Regarding claim 8, Chatter discloses at least one port to support data transfers, via one or more links; and a port configuration mechanism to configure and train the port to serve as a 1x capable port which transfer data via a 1x link, a 4x capable port which transfers data via respective 4x links, or four (4) independent 1x ports which transfer data via a respective lx link (e.g., col. 9, lines 35-38).

Regarding claim 14, Chatter also discloses four independent Link Training Logic Blocks arranged to train each link independently (e.g., col. 9, lines 50-52; Fig. 9) to enable the port to serve as the 1x capable port, the 4x capable port, or the four (4) independent 1x ports (e.g., col. 9, lines 35-38).

Regarding claim 15, Chatter also discloses when the port is configured as one 1x capable port or one 4x capable port, only one Link Training Logic Block is enabled and the remainder Logic Blocks are disabled (e.g., col. 9, lines 15-20).

Regarding claim 16, Chatter also discloses when the port is configured as four (4) independent 1x capable ports, all four Link Training Logic Blocks are enabled and each 1x capable port operates independently from each other (e.g., col. 9, lines 8-11).

Regarding claim 17, Chatter discloses a medium comprising instructions that, when executed by a host node in a switched fabric including end nodes and switches interconnected via one or more links (e.g., Fig. 8, "crossbar switch"), cause the host node to support multiple port configurations on the host node by performing the steps of: determining if a designated port in the host node supports a multi-link mode operation for data transfers, via one or more links (e.g., col. 9, lines 50-52); and if the designated port supports the multi-link mode operation, configuring and training the designated port to serve as one of a single link capable port which transfer data via a single link, a multiple link capable port which transfers data via respective multiple links, and multiple of single link ports which transfer data via a respective single link (e.g., col. 9, lines 35-38).

Regarding claim 18, Chatter also discloses wherein the single link capable port corresponds to a 1x capable port which transfer data via a single 1x link, the multiple link capable port corresponds to a 4x capable port which transfers data via respective 4x links, and the multiple of single link ports correspond to four (4) independent 1x ports which transfer data via a respective single 1x link (e.g., col. 9, lines 35-38; Fig. 10).

Regarding claim 19, Chatter also discloses wherein each link is trained independently to enable the designated port to serve as the 1x capable port, the 4x capable port, or the four (4) independent 1x ports (e.g., col. 9, lines 35-38).

Claim 1-12 and 14-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Doyle (US 2003/0018761).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claim 1, Doyle discloses determining if a designated port supports a multi-link mode operation for data transfers, via one or more links (e.g., paragraph [0020]); and if the designated port supports the multi-link mode operation, configuring and training the designated port to serve as one of a single link capable port which transfer data via a single link, a multiple link capable port which transfers data via respective multiple links, and multiple of single link ports which transfer data via a respective single link (e.g., paragraph [0018]).

Regarding claim 2, Doyle also discloses wherein the multi-link mode operation corresponds to a 4x mode operation where 4x indicates four (4) physical links between respective ports (e.g., paragraph [0018]).

Regarding claim 3, Doyle also discloses the single link capable port corresponds to a 1x capable port which transfer data via a single 1x link, the multiple link capable port corresponds to a 4x capable port which transfers data via respective 4x links, and the multiple of single link ports correspond to four (4) independent 1x ports which transfer data via a respective single 1x link (e.g., paragraph [0018]).

Regarding claim 4, Doyle also discloses each link is trained independently to enable the designated port to serve as the 1x capable port, the 4x capable port, or the four (4) independent 1x ports (e.g., paragraph [0018]).

Regarding claim 5, Doyle also discloses wherein the designated port is configured for the multi-link mode operation using a PortInfo Attribute in accordance with the "InifiniBand.TM. Architecture Specification" (e.g., paragraph [0014]).

Regarding claim 6, Doyle does not expressly mention the VCRC; however this is an inherent feature of the Infiniband standard, as evidenced by Collier (US 6732318). Collier discloses the VCRC appended to the end of each packet as an inherent feature of the Infiniband standard (e.g., col. 3, lines 39-43).

Regarding claim 7, Doyle does not expressly mention the VCRC for each packet sent; however this is an inherent feature of the Infiniband standard, as evidenced by Collier. Collier discloses the VCRC appended to the end of each packet as an inherent feature of the Infiniband standard (e.g., col. 3, lines 39-43).

Regarding claim 8, Doyle discloses at least one port to support data transfers, via one or more links (e.g., paragraph [0020]); and a port configuration mechanism to configure and train the port to serve as a 1x capable port which transfer data via a 1x link, a 4x capable port which transfers data via respective 4x links, or four (4) independent 1x ports which transfer data via a respective Ix link (e.g., paragraph 0018]).

Regarding claim 9, Doyle also discloses the port is configured for a multi-link mode operation using a PortInfo Attribute in accordance with the "InfiniBand.TM. Architecture Specification" (e.g., paragraph [0014]).

Regarding claim 10, Doyle does not expressly mention the VCRC; however this is an inherent feature of the Infiniband standard, as evidenced by Collier. Collier discloses the VCRC appended to the end of each packet as an inherent feature of the Infiniband standard (e.g., col. 3, lines 39-43).

Regarding claims 11 and 12, Doyle does not expressly mention the VCRC for each packet sent; however this is an inherent feature of the Infiniband standard, as evidenced by Collier. Collier discloses the VCRC appended to the end of each packet as an inherent feature of the Infiniband standard (e.g., col. 3, lines 39-43).

Regarding claim 14, Doyle also discloses the port configuration mechanism further comprises four independent Link Training Logic Blocks arranged to train each link independently to enable the port to serve as the 1x capable port, the 4x capable port, or the four (4) independent 1x ports (e.g., paragraph [0025]).

Regarding claim 15, Doyle also discloses when the port is configured as one 1x capable port or one 4x capable port, only one Link Training Logic Block is enabled and the remainder Logic Blocks are disabled (e.g., paragraph [0018]).

Regarding claim 16, Doyle also discloses when the port is configured as four (4) independent 1x capable ports, all four Link Training Logic Blocks are enabled and each 1x capable port operates independently from each other (e.g., paragraph [0018]).

Regarding claim 17, Doyle discloses a medium comprising instructions that, when executed by a host node in a switched fabric including end nodes and switches interconnected via one or more links (e.g., paragraph [0020]), cause the host node to support multiple port configurations on the host node by performing the steps of: determining if a designated port in the host node supports a multi-link mode operation for data transfers, via one or more links; and if the designated port supports the multi-link mode operation, configuring and training the designated port to serve as one of a single link capable port which transfer data via a single link, a multiple link capable port which transfers data via respective multiple links, and multiple of single link ports which transfer data via a respective single link (e.g., paragraph [0018]).

Regarding claim 18, Doyle also discloses the single link capable port corresponds to a 1x capable port which transfer data via a single 1x link, the multiple link capable port corresponds to a 4x capable port which transfers data via respective 4x links, and the multiple of single link ports correspond to four (4) independent 1x ports which transfer data via a respective single 1x link (e.g., paragraph [0018]).

Regarding claim 19, Doyle also discloses each link is trained independently to enable the designated port to serve as the 1x capable port, the 4x capable port, or the four (4) independent 1x ports (e.g., paragraph [0018]).

Regarding claim 20, Doyle also discloses the designated port is configured for the multi-link mode operation using a PortInfo Attribute in accordance with the "InfiniBand.TM. Architecture Specification" (e.g., paragraph [0014]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5-7, 9-13, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chatter in view of Collier (US 6732318).

Regarding claims 5, 9, and 20, Chatter does not expressly mention using the Infiniband protocol; Collier discloses this feature. Collier discloses the use of the Infiniband standard. It would have been obvious to combine Collier with Chatter because Collier teaches the Infiniband as advantageous for connecting various I/O nodes and its benefit for bridging to internet or remote computer systems (e.g., col. 2, lines 56-67), which is precisely describes the system of Chatter (e.g., Figure 8; col. 6,

line 58 – col. 7, line 3; col. 2, lines 18-37). Therefore, it would have been obvious to combine Collier with Chatter to obtain the claimed invention.

Regarding claim 6, Chatter does not mention using a redundancy check on transmitted data; however this is widely known in the art as evidenced by Collier. Collier discloses use of the redundancy check on data (e.g., col. 1, lines 14-16) and in particular discloses appending a VCRC at the end of each packet (e.g., col. 3, lines 38-47). It would have been obvious to combine Collier with Chatter because Collier teaches the advantages of appending CRC checksums on packages sent over links to ensure the accuracy of the data sent. An obvious application of this teaching is Collier who sends packages over a wide variety of links (e.g., col. 9, lines 1-7). Therefore it would have been obvious to one of ordinary skill in the art to combine Collier with Chatter to obtain the claimed invention.

Regarding claim 7, Chatter does not mention using a redundancy check for each packet sent; however this is widely known as evidenced by Collier. Collier discloses the use of the redundancy check on each packet (e.g., col. 3, lines 38-47).

Regarding claim 10, Chatter does not expressly mention the redundancy check for packets; however this feature is disclosed by Collier. Collier also discloses using a VCRC for every packet (e.g., col. 3, lines 39-43).

Regarding claims 11 and 12, Chatter does not expressly mention the redundancy check for packets; however this feature is disclosed by Collier. Collier also discloses using a VCRC for each packet (e.g., col. 3, lines 39-43).

Regarding claim 13, Chatter does not expressly mention the VCRC check or its specific implementation; however Collier discloses the details. Collier discloses a 64 bit CRC Generation Block arranged to compute the VCRC for most of the data packet when data is transferred 8 bytes at a time; a 32 bit CRC Generation Block arranged to compute the VCRC for the last 4 bytes of the data packet if the data packet has an odd number of 4 byte words, and to compute the Link CRC for link packets (e.g., col. 4, lines 21-29); a first Mux arranged to select if a 64 bit or a 32 bit Generated CRC is used in accordance with a first selection signal (e.g., col. 4, lines 50-52); a plurality of CRC Registers arranged to hold the CRC State for Port designations; and a second Mux arranged to select an output from any one of the CRC Registers for CRC feedback, via a CRC feedback bus in accordance with a second selection signal (e.g., col. 4, line 66 – col. 5, line 2).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doyle in view of Collier.

Regarding claim 13, Doyle does not expressly mention the details of calculating the CRC value; however Collier discloses this feature. Collier discloses a 64 bit CRC Generation Block arranged to compute the VCRC for most of the data packet when data is transferred 8 bytes at a time; a 32 bit CRC Generation Block arranged to compute the VCRC for the last 4 bytes of the data packet if the data packet has an odd number of 4 byte words, and to compute the Link CRC for link packets (e.g., col. 4, lines 21-29); a first Mux arranged to select if a 64 bit or a 32 bit Generated CRC is used in accordance with a first selection signal (e.g., col. 4, lines 50-52); a plurality of CRC

Registers arranged to hold the CRC State for Port designations; and a second Mux arranged to select an output from any one of the CRC Registers for CRC feedback, via a CRC feedback bus in accordance with a second selection signal (e.g., col. 4, line 66 – col. 5, line 2). It would have been obvious to combine Collier with Doyle because Collier teaches a flexible method for generating the CRC for the Infiniband payload of Doyle. Therefore it would have been obvious to one of ordinary skill in the art to combine Collier with Doyle to obtain the claimed invention.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Munter (US 6108725) also discloses a configurable multi-link port configuration (e.g., col. 12, lines 25-30). McAlpine (US 6167491) also discloses configurable ports (e.g., col. 8, lines 5-17). Osten (US 6735660) discloses general information regarding Infiniband, in particular, sideband ports. Eddington ("InfiniBridge TM: an integrated Infiniband switch and channel adapter") gives general background information on Infiniband. Finally, Sherman (US 6141765) and Dutton (US 6061756) disclose port configuration systems in different bus applications.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Clifford H Knoll whose telephone number is 703-305-8656. The examiner can normally be reached on M-F 0630-1500.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark H Rinehart can be reached on 703-305-4815. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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